

TTB Form 5154.1

Preparing formulas for submission to
the Nonbeverage Products Laboratory

(240)264-1473

John.Shifflett@ttb.gov

Why should you be interested?

1. Increasing workload impacts our ability to process submissions in a timely manner.
2. Incomplete or incorrectly formatted submissions require more time and effort to process.
3. Number 2 intensifies the problem in number 1.



What types of submissions do we see?

Roughly 80 to 90% of the formulas processed by the Nonbeverage Products Laboratory fall into two categories

- Compounded Flavors
- Simple Extracts



Can you spot the problems in this submission?

Formula approval: OMB No. 1512-0095 (09/30/98)																	
DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT <i>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</i>			1. FORMULA NUMBER 75														
			2. KIND (e.g. Alcohol, Rum) PROOF OF SPIRITS ON WHICH DRAWBACK WILL BE CLAIMED.														
3. NAME OF PRODUCT. Pineapple Flavor	4. CHECK IF SAMPLE WILL BE SUBMITTED <input type="checkbox"/>	5. NUMBER OF DAYS TO COMPLETE PROCESS 1															
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL BE PRODUCED (if multiple production sites, list other addresses on reverse). Uncle John's Flavors of Jupiter 1401 Cherry Lane Offshoresville, MD 20850		7. CHECK KIND OF PRODUCT: <input type="checkbox"/> MEDICINE/ MEDICINAL PREPARATION <input checked="" type="checkbox"/> FLAVOR/ FLAVORING EXTRACT <input type="checkbox"/> FOOD PRODUCT <input type="checkbox"/> PERFUME	8. FORMULAS SUPERSEDED.														
		9. ELIGIBLE ABSOLUTE ALCOHOL VOLUME USED. <i>(See instructions)</i> 6.70%	10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. 6.7 +/- 3														
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. <i>(See instructions)</i> .		12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO) B. DOES PRODUCT CONTAIN GREATER THAN 0.1% ARTIFICIAL FLAVORING <i>(Excluding Vanillin, Ethyl Vanillin, Maltol, Ethyl Maltol)</i> ? (Yes or No) C. STATE PARTS PER MILLION IN PRODUCT OF: VANILLIN ETHYL VANILLIN SYNTHETIC MALTOL ETHYL MALTOL D. DOES PRODUCT CONTAIN A COLOR ADDITIVE? IF YES, WHICH? E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)															
13. FORMULA AND PROCESS <i>(Use Additional Space on Reverse if Necessary)</i> . <table><tbody><tr><td>Ethanol</td><td>5.70 lbs (0.84 gal)</td></tr><tr><td>Natural Acetic Acid</td><td>1.25 lbs</td></tr><tr><td>Pineapple Essence (2-4% alcohol)</td><td>7.25 lbs (0.91 gal)</td></tr><tr><td>Ethyl Caproate and other FEMA GRAS natural esters</td><td>3.40 lbs</td></tr><tr><td>Vanillin</td><td>0.75 lbs</td></tr><tr><td>Propylene Glycol</td><td>81.65 lbs</td></tr><tr><td>Final yield</td><td><hr/>100.00 lbs (11.90 gal)</td></tr></tbody></table>				Ethanol	5.70 lbs (0.84 gal)	Natural Acetic Acid	1.25 lbs	Pineapple Essence (2-4% alcohol)	7.25 lbs (0.91 gal)	Ethyl Caproate and other FEMA GRAS natural esters	3.40 lbs	Vanillin	0.75 lbs	Propylene Glycol	81.65 lbs	Final yield	<hr/> 100.00 lbs (11.90 gal)
Ethanol	5.70 lbs (0.84 gal)																
Natural Acetic Acid	1.25 lbs																
Pineapple Essence (2-4% alcohol)	7.25 lbs (0.91 gal)																
Ethyl Caproate and other FEMA GRAS natural esters	3.40 lbs																
Vanillin	0.75 lbs																
Propylene Glycol	81.65 lbs																
Final yield	<hr/> 100.00 lbs (11.90 gal)																
14. CONTACT PERSON <i>(Include Area Code & Phone No.)</i> Uncle John Jr. (123)456-7890		15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT. <i>Uncle John Jr.</i>	16. DATE. 9/6/2002														

DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PRODUCT			1. FORMULA NUMBER 75
3. NAME OF PRODUCT. Pineapple Flavor		4. CHECK IF SAMPLE WILL BE SUBMITTED <input type="checkbox"/>	5. NUMBER OF DAYS TO COMPLETE PROCESS 1
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL BE PRODUCED (if multiple production sites, list other addresses on reverse). Uncle John's Flavors of Jupiter 1401 Cherry Lane Offshoresville, MD 20850		7. CHECK KIND OF PRODUCT: <input type="checkbox"/> MEDICINE/ MEDICINAL PREPARATION <input checked="" type="checkbox"/> FLAVOR/ FLAVORING EXTRACT <input type="checkbox"/> FOOD PRODUCT PERFUME	8. FORMULAS SUPERSEDED.
		9. ELIGIBLE ABSOLUTE ALCOHOL VOLUME USED. (See instructions) 6.70%	10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. 6.7 +/- 3
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. (See instructions).		12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO) B. DOES PRODUCT CONTAIN GREATER THAN 0.4% ARTIFICIAL FLAVORING (Excluding Vanillin, Ethyl Vanillin, Maltol, Ethyl Maltol)? (Yes or No) C. STATE PARTS SYNTHETIC M D. DOES PRODUCT CONTAIN A COLOR ADDITIVE? E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)	
13. FORMULA AND PROCESS (Use Additional Space on Reverse if Necessary).			
Ethanol		5.70 lbs (0.84 gal)	
Natural Acetic Acid		1.25 lbs	
Pineapple Essence (2-4% alcohol)		7.25 lbs (0.91 gal)	
Ethyl Caproate and other FEMA GRAS		3.40 lbs	
Vanillin		0.75 lbs	
Propylene Glycol		81.65 lbs	
Final yield		100.00 lbs (11.90 gal)	
14. CONTACT PERSON (Include Area Code & Phone Number) Uncle John Jr. (123)456-7890		16. DATE. 9/6/2002	
15. TITLE OF APPLICATION OR AUTHORIZED AGENT. Uncle John Jr.			

Nat, art, or both?

no indication
of proofall sources
of alcohol?

correct
tolerance?Ethyl caproate
predominant?

quantity?

nat or art?

<p align="center">DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT <i>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</i></p>			1. FORMULA NUMBER <p align="center">75</p>													
3. NAME OF PRODUCT. <p align="center">Nat & Art Pineapple</p>	4. CHECK IF SAMPLE WILL BE SUBMITTED <div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div>	5. NUMBER OF DAYS TO COMPLETE PROCESS <p align="center">1</p>	2. KIND (e.g. Alcohol, Rum) PROOF OF SPIRITS ON WHICH DRAWBACK WILL BE CLAIMED. <p align="center">Alcohol 190 Proof</p>													
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL BE PRODUCED (if multiple production sites, list other addresses on reverse). <p align="center">Uncle John's Flavors of Jupiter 1401 Cherry Lane Offshoresville, MD 20850</p>	7. CHECK KIND OF PRODUCT: <input type="checkbox"/> MEDICINE/ MEDICINAL PREPARATION <input checked="" type="checkbox"/> FLAVOR/ FLAVORING EXTRACT <input type="checkbox"/> FOOD PRODUCT PERFUME 9. ELIGIBLE ABSOLUTE ALCOHOL VOLUME USED. <i>(See instructions)</i> <p align="center">6.70%</p>	8. FORMULAS SUPERSEDED. 10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. <p align="center">6.9 +/- 1</p>														
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. <i>(See instructions)</i> .	12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO) B. DOES PRODUCT CONTAIN GREATER THAN 0.1% ARTIFICIAL FLAVORING <i>(Excluding Vanillin, Ethyl Vanillin, Maltol, Ethyl Maltol)?</i> (Yes or No) C. STATE PARTS PER MILLION IN PRODUCT OF: VANILLIN ETHYL VANILLIN SYNTHETIC MALTOL ETHYL MALTOL D. DOES PRODUCT CONTAIN A COLOR ADDITIVE? IF YES, WHICH? E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)															
13. FORMULA AND PROCESS <i>(Use Additional Space on Reverse if Necessary)</i> . <table> <tr> <td>Alcohol 190 proof</td> <td align="right">5.70 lbs (0.84 gal)</td> </tr> <tr> <td>Natural Acetic Acid</td> <td align="right">1.25 lbs</td> </tr> <tr> <td>Pineapple Essence (2-4% alcohol)</td> <td align="right">7.25 lbs (0.91 gal)</td> </tr> <tr> <td>Ethyl Caproate (1.0 lbs) and other FEMA GRAS natural esters</td> <td align="right">3.40 lbs</td> </tr> <tr> <td>artificial vanillin (ex tumeric)</td> <td align="right">0.75 lbs</td> </tr> <tr> <td>Propylene Glycol</td> <td align="right">81.65 lbs</td> </tr> <tr> <td> Final yield</td> <td align="right"> <hr/>100.00 lbs (11.90 gal)</td> </tr> </table>			Alcohol 190 proof	5.70 lbs (0.84 gal)	Natural Acetic Acid	1.25 lbs	Pineapple Essence (2-4% alcohol)	7.25 lbs (0.91 gal)	Ethyl Caproate (1.0 lbs) and other FEMA GRAS natural esters	3.40 lbs	artificial vanillin (ex tumeric)	0.75 lbs	Propylene Glycol	81.65 lbs	 Final yield	 <hr/> 100.00 lbs (11.90 gal)
Alcohol 190 proof	5.70 lbs (0.84 gal)															
Natural Acetic Acid	1.25 lbs															
Pineapple Essence (2-4% alcohol)	7.25 lbs (0.91 gal)															
Ethyl Caproate (1.0 lbs) and other FEMA GRAS natural esters	3.40 lbs															
artificial vanillin (ex tumeric)	0.75 lbs															
Propylene Glycol	81.65 lbs															
 Final yield	 <hr/> 100.00 lbs (11.90 gal)															
14. CONTACT PERSON <i>(Include Area Code & Phone No.)</i> <p align="center">Uncle John Jr. (123)456-7890</p>	15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT. <p align="center"><i>Uncle John Jr.</i></p>	16. DATE. <p align="center">9/6/2002</p>														

Calculations:

1) Item 9 - Calculate Eligible Absolute Alcohol (by volume). The source in this formula is the 190 Proof Alcohol:

a) Convert weight to volume

$$5.70 \text{ lbs} \div 6.7943 \text{ lbs/gal} = 0.84 \text{ gal}$$

b) Calc absolute gallons of ethanol (abs gal EtOH)

$$0.84 \text{ gal} \times 0.95 = 0.80 \text{ abs gal EtOH}$$

c) Divide abs gal EtOH by the actual yield

$$0.80 \text{ abs gal EtOH} \div 11.90 \text{ gal} = 0.067$$

d) $0.067 \times 100 = 6.70\%$ (item 9)

Calculations (cont'd):

2) Item 10 – Calculated by dividing the total alcohol content by the theoretical yield. Note that there are two sources of alcohol in the formula:

- a) The **abs gal EtOH** from 190 proof alcohol was calculated for item 9 → 0.80 **abs gal EtOH**
- b) Calculate the **abs gal EtOH** from the Pineapple Essence
 $0.91 \text{ gal} \times 0.03 \text{ (mid-range)} = 0.027 \text{ abs gal EtOH}$
- c) Divide the sum of the **abs gal EtOH** by the theoretical yield →
 $(0.80 + 0.027) \text{ abs gal EtOH} \div 11.90 \text{ gal} = \mathbf{0.069 \text{ or } 6.9\%}$

The tolerance for item 10 can be found in the **Tolerance Table**.

Note: for simple mixtures, the theoretical yield ~ actual yield.

Tolerance table for item 10 – TTB form 5154.1

Alcohol percentage	Tolerances (Absolute %)	
	Simple mixture	Filtration
(200°) > 95	93 – 100	91 – 100
(190°) > 90	88 – 95	86 – 95
>80 – 90	± 3.5	± 4.5
>70 – 80	± 3.0	± 4.0
>60 – 70	± 2.5	± 3.5
>40 – 60	± 2.0	± 3.0
>20 – 40	± 1.5	± 2.5
1 – 20	± 1.0	± 2.0

Can you spot the problems in this submission?

<div>DEPARTMENT OF THE TREASURY</div> <div>BUREAU OF ALCOHOL, TOBACCO AND FIREARMS</div> <div>FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT</div> <div>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</div>		<div>1. FORMULA NUMBER</div> <div>111</div> <div>2. KIND (e.g. Alcohol, Rum)</div> <div>PROOF OF SPIRITS ON WHICH</div> <div>DRAWBACK WILL BE CLAIMED.</div> <div>Alcohol 190 Proof</div>
<div>3. NAME OF PRODUCT.</div> <div>Natural Raspberry Flavor</div>	<div>4. CHECK IF SAMPLE</div> <div>WILL BE SUBMITTED</div> <div><input type="checkbox"/></div>	<div>5. NUMBER OF DAYS TO</div> <div>COMPLETE PROCESS</div> <div>1</div>
<div>6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL</div> <div>BE PRODUCED (if multiple production sites, list other addresses on reverse).</div> <div>Discount Flavor Warehouse</div> <div>1401 Goinmy Way</div> <div>Overthere Air, MD 45678</div>		<div>7. CHECK KIND OF PRODUCT:</div> <div><input type="checkbox"/> MEDICINE/ MEDICINAL PREPARATION</div> <div><input checked="" type="checkbox"/> FLAVOR/ FLAVORING EXTRACT</div> <div><input type="checkbox"/> FOOD PRODUCT</div> <div>PERFUME</div> <div>8. FORMULAS SUPERSEDED.</div>
<div>9. ELIGIBLE ABSOLUTE ALCOHOL</div> <div>VOLUME USED. (See instructions)</div> <div>31.5</div>		<div>10. ALCOHOL CONTENT BY VOLUME</div> <div>OF FINISHED PRODUCT.</div> <div>30.7 ± 1.5</div>
<div>11. IF MADE WITH RECOVERED SPIRITS:</div> <div>ELIGIBLE PLUS RECOVERED ABSOLUTE</div> <div>ALCOHOL BY VOLUME USED. (See instructions).</div>	<div>12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES:</div> <div>A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO)</div> <div>B. DOES PRODUCT CONTAIN GREATER THAN 0.1% ARTIFICIAL FLAVORING (Excluding Vanillin, Ethyl Vanillin,Maltol, Ethyl Maltol)?</div> <div>(Yes or No)</div> <div>C. STATE PARTS PER MILLION IN PRODUCT OF: VANILLIN</div> <div>ETHYL VANILLIN</div> <div>SYNTHETIC MALTOL</div> <div>ETHYL MALTOL</div> <div>D. DOES PRODUCT CONTAIN A COLOR ADDITIVE?</div> <div>IF YES, WHICH?</div> <div>E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)</div>	
<div>13. FORMULA AND PROCESS (Use Additional Space on Reverse if Necessary).</div> <div>Alcohol 190 Proof25.0%</div> <div>Propylene glycol55.8%</div> <div>Citric acid, anhydrous8.7%</div> <div>Tannic acid5.39%</div> <div>Raspberry Flavor4.1%</div> <div>FEMA GRAS natural esters1.0%</div> <div>Nat Trans-2-Hexenal0.01%</div> <div>yield100%</div> <div>FILTRATION</div>		
<div>14. CONTACT PERSON (Include Area Code & Phone No.)</div> <div>A. Discount III</div> <div>(123)456-7890</div>	<div>15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT.</div>	<div>16. DATE.</div> <div>6/21/2004</div>



DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT <i>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</i>			1. FORMULA NUMBER 111																				
3. NAME OF PRODUCT. Natural Raspberry Flavor WONF	4. CHECK IF SAMPLE WILL BE SUBMITTED <input type="checkbox"/>	5. NUMBER OF DAYS TO COMPLETE PROCESS 1	2. KIND (e.g. Alcohol, Rum) PROOF OF SPIRITS ON WHICH DRAWBACK WILL BE CLAIMED. Alcohol 190 Proof Disapproved # 12																				
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL BE PRODUCED (if multiple production sites, list other addresses on reverse). Discount Flavor Warehouse 1401 Goinmy Way Overthere Air, MD 45678		7. FORMULAS SUPERSEDED. 10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. 30.7 ± 1.5	8. FORMULAS SUPERSEDED. 10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. 30.7 ± 1.5																				
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. <i>(See instructions)</i> .		12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO) B. DOES PRODUCT CONTAIN GREATER THAN 0.1% ARTIFICIAL FLAVORING <i>(Excluding Vanillin, Ethyl Vanillin, Maltol, Ethyl Maltol)?</i> (Yes or No) C. STATE PARTS PER MILLION IN PRODUCT OF: VANILLIN ETHYL VANILLIN SYNTHETIC MALTOL ETHYL MALTOL D. DOES PRODUCT CONTAIN A COLOR ADDITIVE? IF YES, WHICH? E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)																					
13. FORMULA AND PROCESS <i>(Use Additional Space on Reverse if Necessary)</i> . <table> <tr> <td>Alcohol 190 Proof</td> <td>25.0 lbs (3.7 gal)</td> </tr> <tr> <td>Propylene glycol</td> <td>55.8 lbs</td> </tr> <tr> <td>Citric acid, anhydrous</td> <td>8.7 lbs</td> </tr> <tr> <td>Tannic acid</td> <td>5.39 lbs</td> </tr> <tr> <td>Raspberry Flavor (5% alcohol, dissaproved # 12)</td> <td>4.1 lbs (0.51 gal)</td> </tr> <tr> <td>Ethyl Butyrate (0.05 lbs) and other natural esters</td> <td>1.0 lbs</td> </tr> <tr> <td>Nat Trans-2-Hexenal</td> <td>0.01 lbs</td> </tr> <tr> <td>theoretical yield</td> <td>100 lbs (11.5 gal)</td> </tr> <tr> <td>actual yield</td> <td>97 lbs (11.2 gal)</td> </tr> <tr> <td colspan="2">FILTRATION</td> </tr> </table>				Alcohol 190 Proof	25.0 lbs (3.7 gal)	Propylene glycol	55.8 lbs	Citric acid, anhydrous	8.7 lbs	Tannic acid	5.39 lbs	Raspberry Flavor (5% alcohol, dissaproved # 12)	4.1 lbs (0.51 gal)	Ethyl Butyrate (0.05 lbs) and other natural esters	1.0 lbs	Nat Trans-2-Hexenal	0.01 lbs	theoretical yield	100 lbs (11.5 gal)	actual yield	97 lbs (11.2 gal)	FILTRATION	
Alcohol 190 Proof	25.0 lbs (3.7 gal)																						
Propylene glycol	55.8 lbs																						
Citric acid, anhydrous	8.7 lbs																						
Tannic acid	5.39 lbs																						
Raspberry Flavor (5% alcohol, dissaproved # 12)	4.1 lbs (0.51 gal)																						
Ethyl Butyrate (0.05 lbs) and other natural esters	1.0 lbs																						
Nat Trans-2-Hexenal	0.01 lbs																						
theoretical yield	100 lbs (11.5 gal)																						
actual yield	97 lbs (11.2 gal)																						
FILTRATION																							
14. CONTACT PERSON (Include Area Code & Phone No.) A. Discount III (123)456-7890		15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT. <i>A. Discount III</i>																					
		16. DATE. 6/21/2004																					

Eligible
alcohol in
TTB #12

Calculations:

1. Item 9 - two sources of eligible alcohol in this formula

a) First source of eligible alcohol - 190 proof ethanol

$$25.0 \text{ lbs} \div 6.7943 \text{ lbs/gal} = 3.68 \text{ gal}$$

$$3.68 \text{ gal} \times 0.95 = 3.50 \text{ gal abs EtOH}$$

b) Second source of eligible alcohol - the disapproved Raspberry Flavor

$$0.51 \text{ gal} \times 0.050 = 0.026 \text{ gal abs EtOH}$$

c) Add up the gallons of absolute alcohol and divide by the actual yield

$$(3.50 + 0.026) \text{ gal abs EtOH} \div 11.2 \text{ gal} = 0.315 \text{ or } \mathbf{31.5\%}$$

Calculations (cont'd):

2) Item 10 calculation – use theoretical yield in this calculation

- a) In this example, the calculation of absolute gallons of ethanol is the same as in item 9.

$$(3.50 + 0.026) \text{ gal abs EtOH} = 3.526 \text{ gal abs EtOH}$$

- b) divide this by the theoretical yield to get the ethanol content for item 10:

$$3.526 \text{ gal abs EtOH} \div 11.5 \text{ gal} = 0.307 \text{ or } \mathbf{30.7\%}$$

- c) The tolerance for item 10 can be found in the **Tolerance Table**.

Tolerance table for item 10 – TTB form 5154.1

Alcohol percentage	Tolerances (Absolute %)	
	Simple mixture	Filtration
(200°) > 95	93 – 100	91 – 100
(190°) > 90	88 – 95	86 – 95
>80 – 90	± 3.5	± 4.5
>70 – 80	± 3.0	± 4.0
>60 – 70	± 2.5	± 3.5
>40 – 60	± 2.0	± 3.0
>20 – 40	± 1.5	± 2.5
1 – 20	± 1.0	± 2.0

Filtered Products:

Why do we use the final yield to calculate item 9?

It is not simply the ethanol in the final product that is calculated, it is the ethanol used in the manufacturing process. This is especially important for products where some or all of the ethanol was lost due to processing.

Why do we use the theoretical yield to calculate item 10?

When filtration is the only other processing step, the ethanol content in the final product will be determined by the proportioning of **miscible** ingredients during mixing (even though there will be a loss of product to the filtration step).

Since filtration is not a selective process for dissolved components we would not expect the ethanol level to change.



Can you spot the problems in this submission?

Formula approval: OMB No. 1512-0095 (09/30/98)												
DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT <i>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</i>		1. FORMULA NUMBER 333										
3. NAME OF PRODUCT. Natural Citrus Flavor	4. CHECK IF SAMPLE WILL BE SUBMITTED <input type="checkbox"/>	5. NUMBER OF DAYS TO COMPLETE PROCESS 1										
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL BE PRODUCED (if multiple production sites, list other addresses on reverse). Discount Extract Warehouse 1401 Goinmy Way Overthere Air, MD 45678	7. CHECK KIND OF PRODUCT: <input type="checkbox"/> MEDICINE/ MEDICINAL PREPARATION <input checked="" type="checkbox"/> FLAVOR/ FLAVORING EXTRACT <input type="checkbox"/> FOOD PRODUCT <input type="checkbox"/> PERFUME	8. FORMULAS SUPERSEDED.										
	9. ELIGIBLE ABSOLUTE ALCOHOL VOLUME USED. <i>(See instructions)</i> 60.4	10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. 60.4 ± 3.0										
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. <i>(See instructions)</i>	12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO) B. DOES PRODUCT CONTAIN GREATER THAN 0.1% ARTIFICIAL FLAVORING <i>(Excluding Vanillin, Ethyl Vanillin, Maltol, Ethyl Maltol)?</i> (Yes or No) C. STATE PARTS PER MILLION IN PRODUCT OF: VANILLIN ETHYL VANILLIN SYNTHETIC MALTOL ETHYL MALTOL D. DOES PRODUCT CONTAIN A COLOR ADDITIVE? IF YES, WHICH? E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)											
13. FORMULA AND PROCESS <i>(Use Additional Space on Reverse if Necessary)</i> . <table><tbody><tr><td>Alcohol 190 Proof</td><td>60.0 lbs</td></tr><tr><td>Lemon oil</td><td>6.0 lbs</td></tr><tr><td>Lime oil, expressed</td><td>3.5 lbs</td></tr><tr><td>Water</td><td>30.5 lbs</td></tr><tr><td> Yield</td><td> 100 lbs</td></tr></tbody></table>			Alcohol 190 Proof	60.0 lbs	Lemon oil	6.0 lbs	Lime oil, expressed	3.5 lbs	Water	30.5 lbs	 Yield	 100 lbs
Alcohol 190 Proof	60.0 lbs											
Lemon oil	6.0 lbs											
Lime oil, expressed	3.5 lbs											
Water	30.5 lbs											
 Yield	 100 lbs											
14. CONTACT PERSON (Include Area Code & Phone No.) Dr. Paperstack (123)456-7890	15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT. Dr. Paperstack IV	16. DATE. 6/21/2004										

DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT <i>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</i>			1. FORMULA NUMBER 333
3. NAME OF PRODUCT. Natural Citrus Flavor		4. CHECK IF SAMPLE WILL BE SUBMITTED <input type="checkbox"/>	5. NUMBER OF DAYS TO COMPLETE PROCESS 1
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCED (if multiple production sites, list all) Discount Extract Warehouse 1401 Goinmy Way Overthere Air, MD 45678		7. TYPE OF PRODUCT: A. NATURAL PREPARATION B. EXTRACT C. PRODUCT D. PERFUME 9. ABSOLUTE ALCOHOL VOLUME USED. (See instructions) 60.4	8. PROOF OF SPIRITS ON WHICH DRAWBACK WILL BE CLAIMED. 190 Proof Alcohol Item 10 correct?
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. (See instructions)		12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: Maltol, Ethyl Maltol)? APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)	
13. FORMULA AND PROCESS (Use Additional Space on Reverse) Alcohol 190 Proof Lemon oil Lime oil, expressed Water Yield		60.0 lbs 6.0 lbs 3.5 lbs 30.5 lbs 100 lbs What is the actual yield? Is it a range? processing information?	
14. CONTACT PERSON (Include Area Code & Phone No.) Dr. Paperstack (123)456-7890		15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT. Dr. Paperstack IV	
		16. DATE. 6/21/2004	

Unlikely that item 9 is correct, unfortunately, we cannot check it.

Given the amount of essential oils (10% w/w) and the presence of water, we would expect this to be an extract

Calculations:

1. Item 9 calculation – eligible alcohol comes from the 190 proof ethanol

a) Calculate the volume of absolute ethanol

$$60.0 \text{ lbs} \div 6.7943 \text{ lbs/gal} = 8.83 \text{ gal}$$

$$8.83 \text{ gal} \times 0.95 = 8.39 \text{ gal abs EtOH}$$

b) next, divide by the final yield (actual yield)

low end of yield range

$$8.39 \text{ gal abs EtOH} \div 10.8 \text{ gal} = 0.777 \text{ or } \mathbf{77.7\%}$$

high end of yield range

$$8.39 \text{ gal abs EtOH} \div 11.5 \text{ gal} = 0.730 \text{ or } \mathbf{73.0\%}$$

This provides the range for the eligible alcohol in item 9

Calculations (cont'd):

2. Item 10 calculation

- a) Volume of the starting menstruum. The starting menstruum is the ethanol and water along with other dissolved components (not the oil).

$$\text{Ethanol} = 60.0 \text{ lbs} \div 6.7943 \text{ lbs/gal} = 8.83 \text{ gal}$$

$$\text{Water} = 30.5 \text{ lbs} \div 8.328 \text{ lbs/gal} = 3.66 \text{ gal}$$

$$\text{Sum} = 12.49 \text{ gal}$$

- b) Item 10 = (gal abs EtOH) \div (vol of starting menstruum)

$$8.39 \text{ gal abs EtOH} \div 12.49 \text{ gallons} = 0.672 \text{ or } \mathbf{67.2\%}$$

- c) Apply the tolerance used for filtered products to item 10.

Tolerance table for item 10 – TTB form 5154.1

Alcohol percentage	Tolerances (Absolute %)	
	Simple mixture	Filtration
(200°) > 95	93 – 100	91 – 100
(190°) > 90	88 – 95	86 – 95
>80 – 90	± 3.5	± 4.5
>70 – 80	± 3.0	± 4.0
>60 – 70	± 2.5	± 3.5
>40 – 60	± 2.0	± 3.0
>20 – 40	± 1.5	± 2.5
1 – 20	± 1.0	± 2.0

Why use the starting menstruum?

The oil does not add significant volume to the final product because it will not dissolve to an appreciable extent in the water: ethanol mixture. Once the oil is removed, the ethanol content will be determined by the proportions of the soluble ingredients (in this case, the water and ethanol).

DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS FORMULA AND PROCESS FOR NONBEVERAGE PRODUCT <i>(See instructions attached-Prepare in triplicate, except if manufactured abroad)</i>			1. FORMULA NUMBER 334
3. NAME OF PRODUCT. Lemon Flavor	4. CHECK IF SAMPLE WILL BE SUBMITTED <input type="checkbox"/>	5. NUMBER OF DAYS TO COMPLETE PROCESS 1	2. KIND (e.g. Alcohol, Rum) PROOF OF SPIRITS ON WHICH DRAWBACK WILL BE CLAIMED. 190 Proof Alcohol
6. NAME OF THE MANUFACTURER & ADDRESS WHERE PRODUCTS WILL BE PRODUCED (if multiple production sites, list other addresses on reverse). Discount Extract Warehouse 1401 Goinmy Way Overthere Air, MD 45678		7. CHECK KIND OF PRODUCT: <input type="checkbox"/> MEDICINE/ MEDICINAL PREPARATION <input checked="" type="checkbox"/> FLAVOR/ FLAVORING EXTRACT <input type="checkbox"/> FOOD PRODUCT PERFUME	8. FORMULAS SUPERSEDED.
		9. ELIGIBLE ABSOLUTE ALCOHOL VOLUME USED. <i>(See instructions)</i> 64.2 - 68.1	10. ALCOHOL CONTENT BY VOLUME OF FINISHED PRODUCT. 54.7 ± 3.0
11. IF MADE WITH RECOVERED SPIRITS: ELIGIBLE PLUS RECOVERED ABSOLUTE ALCOHOL BY VOLUME USED. <i>(See instructions)</i> .	12. IF FINISHED PRODUCT IS TO BE USED IN ALCOHOLIC BEVERAGES: A. DOES PRODUCT CONTAIN NATURAL FLAVORING? (YES OR NO) B. DOES PRODUCT CONTAIN GREATER THAN 0.1% ARTIFICIAL FLAVORING <i>(Excluding Vanillin, Ethyl Vanillin, Maltol, Ethyl Maltol)?</i> (Yes or No) C. STATE PARTS PER MILLION IN PRODUCT OF: VANILLIN ETHYL VANILLIN SYNTHETIC MALTOL ETHYL MALTOL D. DOES PRODUCT CONTAIN A COLOR ADDITIVE? IF YES, WHICH? E. ARE ALL INGREDIENTS APPROVED BY FDA FOR USE WITHOUT LIMITATION OR RESTRICTION? (YES OR NO)		
13. FORMULA AND PROCESS <i>(Use Additional Space on Reverse if Necessary)</i> . <div style="display: flex; justify-content: space-between;"> <div> Alcohol 190 Proof Lemon oil Lemon Extract (67.1% alcohol, BigCo TTB# 8180) Water Glycerin Initial yield Actual yield (range) </div> <div> 55.0 lbs (8.10 gal) 6.0 lbs 1.0 lbs (0.14 gal) 15.0 lbs 23.0 lbs 100 lbs 88 - 94 lbs (11.3 - 12.0 gal) </div> </div> Process: Combine ingredients while mixing. Allow oil to separate. Discard top layer. Filter bottom layer with magnesium carbonate.			
14. CONTACT PERSON (Include Area Code & Phone No.) Dr. Igotago (123)456-7890	15. SIGNATURE & TITLE OF APPLICATION OR AUTHORIZED AGENT. <i>Dr. Igotago IV</i>		16. DATE. 6/21/2004

Calculations:

1. Item 9 calculation – Locate the eligible ethanol in the formula. Note that the Lemon Extract has a TTB approval for drawback.

a) Calculate the volume of absolute ethanol

$$55.0 \text{ lbs} \div 6.7943 \text{ lbs/gal} = 8.10 \text{ gal}$$

$$8.10 \text{ gal} \times 0.95 = 7.70 \text{ gal abs EtOH}$$

b) next, divide by the final yield (actual yield)

low end of yield range

$$7.70 \text{ gal abs EtOH} \div 11.3 \text{ gal} = 0.681 \text{ or } \mathbf{68.1\%}$$

high end of yield range

$$7.70 \text{ gal abs EtOH} \div 12.0 \text{ gal} = 0.642 \text{ or } \mathbf{64.2\%}$$

This provides the range for the eligible alcohol in item 9.

Calculations (cont'd):

2. Item 10 calculation

- a) Volume of the starting menstruum. The starting menstruum is the ethanol and water along with other dissolved components (not the oil).

$$\text{Ethanol} = 55.0 \text{ lbs} \times 6.794 \text{ lbs/gal} = 8.10 \text{ gal}$$

$$\text{Lemon Extract} = 0.14 \text{ gal}$$

$$\text{Glycerin} = 23.0 \text{ lbs} \times 9.79 \text{ lbs/gal} = 2.35 \text{ gal}$$

$$\text{Water} = 30.5 \text{ lbs} \times 8.328 \text{ lbs/gal} = 3.66 \text{ gal}$$

$$\text{sum} = 14.25 \text{ gal}$$

Calculations (cont'd):

2. Item 10 calculation (cont'd)

b) Item 10 = [gal abs EtOH] ÷ [volume of starting menstruum]

volume of abs EtOH = 190 proof EtOH + EtOH from TTB # 8180

$$8.10 \text{ gal} \times 0.95 = 7.70 \text{ gal abs EtOH}$$

$$0.14 \text{ gal} \times 0.671 = 0.09 \text{ gal abs EtOH}$$

$$\text{Sum} = 7.79 \text{ gal abs EtOH}$$

Divide this number by the volume of the starting menstruum

$$7.79 \text{ gal abs EtOH} \div 14.25 \text{ gallons} = 0.547 \text{ or } \mathbf{54.7\%}$$

c) Apply the tolerance used for filtered products to item 10.

Tolerance table for item 10 – TTB form 5154.1

Alcohol percentage	Tolerances (Absolute %)	
	Simple mixture	Filtration
(200°) > 95	93 – 100	91 – 100
(190°) > 90	88 – 95	86 – 95
>80 – 90	± 3.5	± 4.5
>70 – 80	± 3.0	± 4.0
>60 – 70	± 2.5	± 3.5
>40 – 60	± 2.0	± 3.0
>20 – 40	± 1.5	± 2.5
1 – 20	± 1.0	± 2.0